

WHAT IS CLAIMED IS:

1. A semiconductor device comprising:

at least one semiconductor element;

5 a first substrate being disposed to face one main surface of the semiconductor element, being provided a plurality of first internal wirings on a main surface of the first substrate on a side facing the semiconductor element, and being provided a plurality of first external wirings being electrically connected
10 to the respective first internal wirings on a main surface of the first substrate on a side opposite to the side facing the semiconductor element; and

a second substrate being formed to be larger than both main surfaces of the semiconductor element by a
15 material having flexibility, being disposed to hold the semiconductor element between the first substrate and the second substrate, being provided a plurality of second internal wirings having one-end portions extended to edges of a main surface of the second
20 substrate on a side facing the semiconductor element on the main surface of the second substrate on the side facing the semiconductor element, and the one-end portions of the second internal wirings electrically connected to the first internal wirings with being bent
25 toward the first substrate together with the edges of the second substrate on which the second internal wirings are provided, being mounted the semiconductor

element having at least one electrode electrically connected to some of the second internal wirings on the main surface of the second substrate on the side facing the semiconductor element, and being provided a plurality of external terminals being electrically connected to some of the second internal wirings on at least a middle part of a main surface of the second substrate on a side opposite to the side on which the semiconductor element is mounted.

2. The device according to claim 1, further comprising:

Au plating portions provided on the surfaces of connection portions of the first and second internal wirings; and a conductive member provided between the Au plating portions of the first and second internal wirings, wherein the first internal wirings are electrically connected to the second internal wirings via the Au plating portions and the conductive member.

3. The device according to claim 1, further comprising:

solder portions provided on the surfaces of connection portions of the first and second internal wirings, wherein the first internal wirings are electrically connected to the second internal wirings via the solder portions.

4. The device according to claim 1, further comprising:

Au plating portions provided on the surfaces of connection portions between the first internal wirings and the second internal wirings and Au bumps provided on the surfaces of the Au plating portions, Sn plating portions provided on the surfaces of the connection portions of the second internal wirings to the first internal wirings, wherein the first internal wirings are electrically connected to the second internal wirings via Au-Sn alloy portions, and the Au-Sn alloy portions are formed by thermally press-bonding the Au plating portions, the Au bumps, and the Sn plating portions.

5. The device according to claim 1, further comprising:

15 a plurality of first plugs provided through the first substrate along a thickness direction of the first substrate and a plurality of second plugs provided through the second substrate along the thickness direction of the second substrate, wherein
20 the first internal wirings are electrically connected to the first external wirings in predetermined patterns via the first plugs, and the second internal wirings are electrically connected to the external terminals in predetermined patterns via the second plugs.

25 6. The device according to claim 1, wherein;
at least one of the electrodes of the semiconductor element is electrically connected to the

external terminals.

7. The device according to claim 1, further comprising:

5 a sealing member provided to coat the semiconductor element, the main surface of the first substrate facing the semiconductor element, and the substrate of the second substrate except the end surfaces of at least the external terminals.

10 8. The device according to claim 1, further comprising:

at least one expansion member provided between the first substrate and the second substrate, wherein the expansion member is provided along at least a part of an outer surface of the semiconductor element, and a
15 portion of the second substrate except a region facing the semiconductor element and the expansion member is bent toward the second substrate.

9. The device according to claim 1, further comprising:

20 at least one second external wiring provided on the main surface of the second substrate on which the external terminals are provided, wherein the second external wiring is used in a predetermined application different from that of the external terminal, and the
25 second external wiring is electrically disconnected from the external terminals.

10. The device according to claim 1, wherein;

the second substrate is formed by use of at least one type of material selected from a group consisting of glass epoxy, polyimide, BT resin, and PCB.

5 11. The device according to claim 1, further comprising:

another electric component mounted on the main surface of the second substrate on which the external terminals are provided, the another electric component being electrically connected to the external terminals.

10 12. The device according to claim 2, wherein;

the conductive member is an anisotropic conductive sheet including a plurality of anisotropic conductive particles.

15 13. The device according to claim 12, wherein;

the anisotropic conductive particles are at least a plurality of Ni particles or a plurality of plastic balls on whose surfaces Au plating portions are provided.

20 14. The device according to claim 11, wherein;

the other electric component is another semiconductor device.

15. A manufacturing method for a semiconductor device, comprising:

25 disposing a first substrate to face a second substrate on whose one main surface at least one semiconductor element is mounted via the semiconductor element, the first substrate being provided a plurality

of first internal wirings on a main surface of the first substrate on a side facing the semiconductor element, the first substrate being provided a plurality of first external wirings being electrically connected to the respective first internal wirings on a main surface of the first substrate on a side opposite to the side facing the semiconductor element, the second substrate being formed to be larger than the both main surfaces of the semiconductor element by a material having flexibility, the second substrate being provided a plurality of second internal wirings having one-end portions extended to an edge of the second substrate and some of the second internal wirings being electrically connected to at least one electrode of the semiconductor element on the main surface of the second substrate on a side on which the semiconductor element is mounted, the second substrate being provided a plurality of external terminals being electrically connected to some of the second internal wirings on at least a middle part of a main surface of the second substrate on a side opposite to the side on which the semiconductor element is mounted, and

bending the respective one-end portions of the second internal wirings toward the first substrate together with the edge of the second substrate on which the second internal wirings are provided while electrically connecting the one-end portions to the

first internal wirings, and integrating the semiconductor element, the first substrate, and the second substrate.

16. The method according to claim 15, wherein;
5 after integrating the semiconductor element, the first substrate, and the second substrate, a sealing member is provided so as to cover the semiconductor element, an exposed surface of the first substrate outside the second substrate in the main surface of the
10 first substrate facing the second substrate, and the surface of the second substrate except at least the end surfaces of the external terminals.

17. The method according to claim 16, wherein;
 the sealing member is provided by a molding/
15 sealing method by use of a mold for the sealing, and the mold for the sealing is formed in a shape such that the end surface of at least the external terminal is exposed after the sealing to provide the sealing member.

20 18. The method according to claim 17, wherein;
 the surface of the mold for the sealing facing the surface of a region of the second substrate on which the external terminals are provided is set to a position where an amount of the sealing member is
25 provided so as to expose at least the end surface of the external terminal after the sealing, and the sealing member is provided between the surface of the

region and the surface of the mold for the sealing facing the surface of the region.

19. The method according to claim 17, wherein;

5 as the mold for the sealing, a mold is formed and used in a shape in which an exposed surface of the first substrate outside the second substrate in the main surface of the first substrate facing the second substrate and the surface of the second substrate are covered and in which a height to the surface of the
10 second substrate facing the surface of a region including the external terminals from the surface of the mold facing the exposed surface of the first substrate is set to $\pm 150 \mu\text{m}$ or less with respect to a height to the surface of the region from the exposed
15 surface.